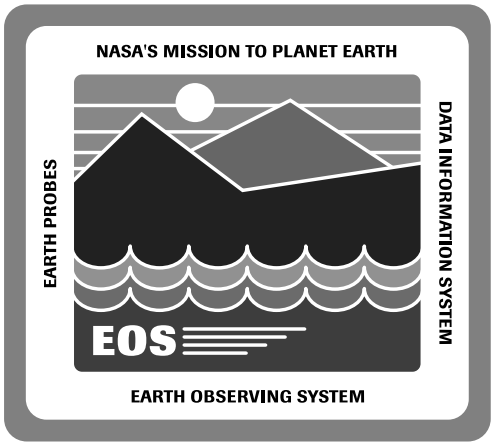
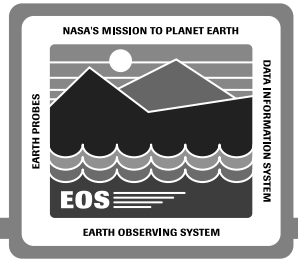


Communications and Systems Management - Summary

Ed Lerner

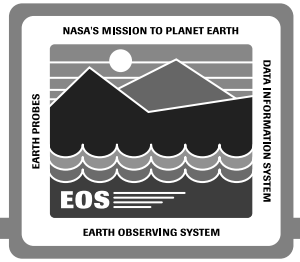
System Design Review - 29 June 1994

Road Map



- **Risks and mitigation**
- **Technology Timetable / Release Map**
- **Prototypes and Studies**
- **Lines of Code**
- **Evolution**

CSMS Risks and Mitigations



CSMS's key risks all derive from one aggressive goal: provide a COTS- and standards-based infrastructure which is state-of-the-art when delivered at Release B and evolvable past Release B.

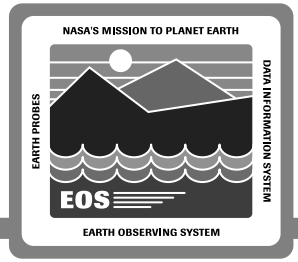
The resulting three risks:

- **DCE Immaturity for Release A**
- **CORBA Immaturity for Release B**
- **Object Management Framework Availability**

CSMS mitigates these risks through its layered architecture, technology timetable, vendor surveys/studies, consortia participation, prototyping, and contingency planning.

The same techniques contribute to overall CSMS evolvability.

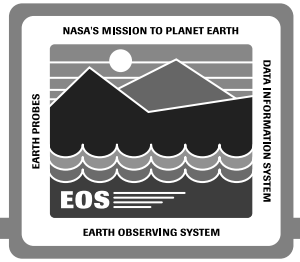
CSMS Risk Mitigations



- DCE Immaturity for Release A
  - DCE Migration and 3rd-Party Product Studies
  - DCE prototyping (multi-vendor; national cell; inter-cell; stress tests)
  - Member, Open Software Foundation; coordination with other DCE users
- CORBA Immaturity for Release B
  - ORB Product Study
  - DCE encapsulation in CORBA APIs prototype (Release A baseline)
  - ORB prototyping (1.1 initially; 2.0 when available)
  - Membership pending, Object Management Group
- Object Management Framework Availability
  - DME Migration Study
  - DME-precursor prototyping
  - Release A based on de facto network-management standards
  - Systems/network management-->object management (future study)
  - Member, Management Integration Consortium, OSF, and (soon) OMG

SDS 6.3.3

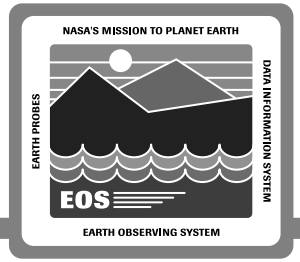
Technology Timetable & Release Map



Subsystem Superclass		Major Component	IR-1	A	B	C/D Candidate
CSS	**ORB**	Interoperability Framework	RPCs via CORBA 1.1 I/Fs	same, or CORBA 1.1 ORB over DCE	CORBA 2.0 ORB	CORBA 2.0 successor and other evolutionary enhancements
	Object Services	Interoperability Services	DCE core services via CORBA I/Fs	Essential object services added (e.g., archive)	CORBA 2.0 services upgrade/added	
	Common Facilities	ECS-Specific Comm. Services	Heritage applica-tions via CORBA I/Fs	Other essential applications added	COTS OO-based applica-tions upgrade/ added	
ISS	**Transport** **Network** **Data Link** **Physical**	All commercial-off-the-shelf (COTS) com-munications software, LAN cards, routers, hubs, concentra-tors, cabling	V0 WAN at V0 sites TCP/IP on LANs at 3 sites To fractional T1 WAN (V0)	ESN WAN at V0 sites TCP/IP on LANs at 4 sites To fractional T3 WAN (V0+)	ESN WAN at V1 sites TCP/IP on LANs at all sites DS3/ATM WAN (TBD)	GB networking and other evolutionary enhancements

SDS 6.3

Technology Timetable & Release Map (Cont.)

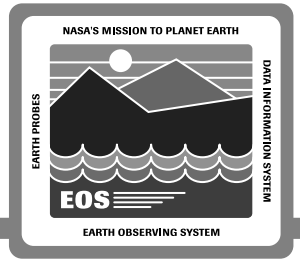


Subsystem Superclass		Major Component	IR-1	A	B	C/D Candidate
MSS	**Common Management Services**	Management Framework: • MUI • Management data RDBMS • Compatible applications	DME 2.0 precursor	Same	object mgmt framework (e.g., DME 3.0)	Management technology successors and other enhance-ments
	Management Applications Services		Mostly network management COTS applica-tions as available for above framework Shadow-manage V0 WAN	Same, plus limited data collection and analysis capabilities for system management Manage ESN WAN at V0 sites	Full enterprise, including custom applications, and COTS as avail-able for above Manage ESN WAN at V1 sites	
	Managed Object Template	MIBs from COTS vendors	Per IETF/SNMP	Per IETF/SNMP	GDMO-based	

Key CSMS Prototypes / Studies

Prototype / Study	Goal	Time Frame
EOSDIS Prototype	Extend DCE-based EP3 Infrastructure	late 1994
ORB interface over DCE	Support DCE to CORBA migration	Release A
Object Passing over DCE	Support heritage application migration	Release A
Internet performance (study)	Research methods to improve user-access performance	Release A/B
Network/system mgmt apps.	Evaluate COTS management products	Release A/B/C
ORB implementations	Evaluate current ORB products	Release B
ATM WAN	DCE operation over ATM; resolve Ecom I/Fs	Release B
Migration to Object Mgmt (study)	Evaluate strategies for migrating from current management COTS base to future OMF	Release B
Infrastructure performance test	Stress-test DCE with large cells, over WAN, with CORBA	Release B/C
ATM LAN	Trade ATM LAN vs. 3-tier LAN architecture	Release B/C
AI in systems mgmt (study)	Access AI diagnosis of complex symptoms	Release C

valuation Packages: A Brief (and Partial) Summary



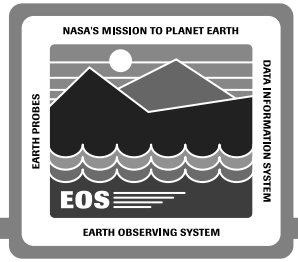
- **EP1-3 (completed)**
  - **DCE cell deployed to all V0 DAACs over V0 WAN and Internet**
  - **DCE interoperability testing with HP, DEC, Sun, IBM, Cray, Convex FEP**
  - **initial CSMS API testing with SDPS: DCE services, statistics capture**
  - **initial network management framework testing**

EP4 (in process)

  - **DCE intercell operations**
  - **DCE/non-DCE interface**
  - **Distributed file systems**
  - **System management applications**

- **EP5-6:**
  - **V0 interoperability (with SDPS)**
  - **CORBA-related activities (based on earlier prototype results)**
  - **Transaction-processing extensions to DCE**
  - **DCE and CORBA development tools**
  - **System management applications**

Contingency Plans



- **DCE failure**
  - **revert to traditional, non-integrated, distributed-computing components (e.g., sockets, DNS, Kerberos)**

- **CORBA failure (several options)**
  - **develop custom ORB over DCE or traditional infrastructure**
  - **develop SDPS-specific integrated advertiser/trader**
  - **adopt single-vendor ORB solution portable to multiple platforms**
  - **integrate OMG IDL directly to DCE idl or sockets (w/o use of ORB)**

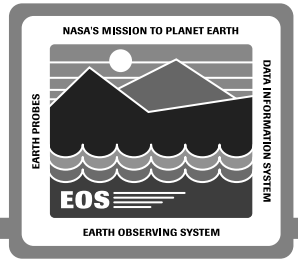
- **Object Management Framework failure (two options)**
  - **stick with DME 2.0 (or precursor) network/system management products**
  - **migrate to new industry consensus if/as one emerges**

We routinely track vendor/consortium status, prototype candidate technologies, and review our technology insertion plans. Minimally, the possible need to effect a contingency plan for a given release is revisited at its RIR and PDR/IDR.

CSMS Custom KLOC by Subsystem by Release

Release	IR-1	R-A	R-B	R-C	R-D	Total
Communications subsystem	36	36	80	36	19	207
Internetworking subsystem	0	0	0	0	0	0
Management subsystem	2	27	36	11	8	84
Total	**38**	**63**	**116**	**47**	**27**	**291**

Summary: CSMS Evolvability Tests



- **Dynamic addition / deletion of DAACs and SCFs:**
  - **Enabled by SDPS DIM/LIM and advertising services; CSS trading service**
  - **Discussed during SDPS and CSMS scenarios**

- **Scalability:**
  - **Enabled by federated, peer-to-peer, extensible architecture**
  - **Discussed during CSS, ISS, and MSS presentations**

- **Multimedia & collaboration**
  - **Enabled by emerging Internet standards, ATM-based quality of service guarantees, and ISO Trader work on end-to-end QoS negotiation**
  - **Discussed during CSMS scenario**

- **Non-Unix operating systems**
  - **Enabled by extensible architecture**
  - **Discussed during CSS presentation**